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[54] **ENHANCED ADAPTIVE STATISTICAL FILTER PROVIDING SPARSE DATA STOCHASTIC MENSURATION FOR RESIDUAL ERRORS TO IMPROVE PERFORMANCE FOR TARGET MOTION ANALYSIS NOISE DISCRIMINATION**

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[58] **Field of Search** 367/135, 99, 118, 367/901; 342/107, 196, 192; 364/516, 517, 724.19

[56] **References Cited**

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[57] **ABSTRACT**

An adaptive statistical filter system for receiving a data stream comprising a series of data values from a sensor associated with successive points in time. Each data value includes a data component representative of the motion of a target and a noise component, with the noise components of data values associated with proximate points in time being correlated. The adaptive statistical filter system includes a prewhitener, a plurality of statistical filters of different orders, stochastic decorrelator and a selector. The prewhitener generates a corrected data stream comprising corrected data values, each including a data component and a time-correlated noise component. The plural statistical filters receive the corrected data stream and generate coefficient values to fit the corrected data stream to a polynomial of corresponding order and fit values representative of the degree of fit of corrected data stream to the polynomial. The stochastic decorrelator uses a spatial Poisson process statistical significance test to determine whether the fit values are correlated. If the test indicates the fit values are not randomly distributed, it generates decorrelated fit values using an autoregressive moving average methodology which assesses the noise components of the statistical filter. The selector receives the decorrelated fit values and coefficient values from the plural statistical filters and selects coefficient values from one of the filters in response to the decorrelated fit values. The coefficient values are coupled to a target motion analysis module which determines position and velocity of a target.

14 Claims, 1 Drawing Sheet